Remarks:

R1 Claims 1 to 28 are pending in the application.

R2 Claims 1 to 28 stand rejected.

R3 Applicant takes this opportunity to address an objection in respect to claim 1 presented in the IPER at item V.1.a. "a first order Markov process" is being claimed in dependent claims 2 and 16 in accordance with current U.S. patent practice.

R4 Applicant takes this opportunity to address objection V.1.b presented in the IPER. "using quasi-coherent integration" has been retained in Summary of the Invention paragraph [0008] of the published application. The Examiner requisitions amendment to read --using coherent integration-- based on description on page 2 lines 19 to 28. Applicant respectfully submits that it is the state of the prior art which is being described on page 2 lines 19 to 28. Support for "coherent integration" is found on page 5 lines 16 to 22 of the U.S. National Phase application.

R5 Applicant takes this opportunity to address objection V.1.c presented in the IPER. In Summary of the Invention paragraph [0008] of the published application "for a small time epoch" has been amended to read --for a measurement epoch of arbitrary duration--. Support is found in the last paragraph on page 2 of the published PCT application WO2004049663.

R6 In claim 1 "measured phase of the received signal" has been amended to read --measured phase of the correlation signal-- in order to improve clarity. Support for the amendment is found on page 6 lines 24 to 26 of the originally filed U.S. National Phase application. The "phase

trajectory" has been qualified as that of "the correlation signal" in order to further improve clarity. Support for the latter amendment is found on page 7 lines 28 to 29 of the originally filed U.S. National Phase application. Other amendments have been made to claim 1 in order to improve readability thereof and to correct antecedents. The Examiner's requisition at point 3 of the outstanding Office Action has been addressed.

R7 Independent claim 15 has been further amended to relate to "a receiver for improving the sensitivity in the demodulation of a received direct sequence spread spectrum signal". Support for the amendment is found in independent claim 1.

R8 In claim 15 "measured phase of said received signal" has been amended to read --measured phase of the despread signal-- in order to improve clarity. Support for the amendment is found in the subsequent clause of claim 15, and paragraph 3 on page 3 of the originally filed U.S. National Phase application. The "phase trajectory" has been qualified as that "of the despread signal" in order to further improve clarity. Support for the latter amendment is found in first paragraph on page 7 of the originally filed U.S. National Phase application. Other amendments have been made to claim 15 in order to improve readability thereof and to correct antecedents.

R9 New independent claim 29 has been added and is directed to a wireless mobile device comprising the receiver of claim 15. Support for the subject matter of claim 29 is found in the penultimate paragraph on page 4 of the originally filed U.S. National Phase application.

R10 Claims 1 to 29 are now pending in the application.

R11 Applicant has identified an obvious clerical error in paragraph [0004] of the U.S. published application: "basket's receiver" has been amended to read --handset's receiver--. Support for the amendment is found in the same paragraph.

R12 It is submitted that no additional subject matter has been introduced by the amendment.

Arguments:

A1 Claim 3 has been rejected under 35 U.S.C. §112 first paragraph apparently because claim 3 "fails to disclose how the examples of assigned probability assignments reflect properties of the receiver". Applicant respectfully submits that "examples of assigned probability assignments" are not being claimed in claim 3.

Support for "the possible state transitions and the probability of the paths [being] assigned to reflect properties of said receiver" subject matter of claim 3 is found in paragraph [0021] of the USPTO published application which reads "the method makes use of the generally known slew rate limitation of the LO instability" in combination with description in paragraph [0032] of the USPTO published application which reads "with these trellis state transition probabilities, the modeled slew rate of the phase dynamics can be accurately limited." Further support is found in paragraphs [0009] and [0010] of the USPTO published application.

Therefore, Applicant respectfully requests the withdrawal of the §112 rejection in respect of claims 3 and 21.

A2 Claim 4 has been rejected under 35 U.S.C. §112 first paragraph because apparently claim 4 does "not provide an explanation/description of how a 'phase slew rate limitation' of a receiver is used as a basis on creating the possible state transitions for each node." Applicant respectfully disagrees.

Support for the subject matter of claim 4 is found in paragraphs [0009] and [0010] of the USPTO published application wherein "due to frequency and phase instabilities in the radio frequency local oscillator [] the phase trajectory is generally a time varying phasor" and "a trellis is created with a fixed number of phase states evenly distributed between zero and 360°. The state transitions in the trellis are limited based on known phase slew rate limitations." Also, the description in paragraph [0032] of the USPTO published application reads "with these trellis state transition probabilities, the modeled slew rate of the phase dynamics can be accurately limited."

Therefore, Applicant respectfully requests the withdrawal of the §112 rejection in respect of claims 4, 8, 22 and 25.

A3 Claims 5, 10 and 11 have been rejected under 35 U.S.C. §112 first paragraph because claims 5, 10, and 11 do "not describe or explain any calculation of 'the known phase slew rate limitation'". Applicant respectfully submits that the specification is sufficiently enabling to a person of ordinary skill in the art.

Applicant respectfully submits that a patent application need be written only for a person of ordinary skill in the art and not for a novice. In *In re Gay, 309 F.2d 769, 135 USPQ 331, 316 (C.C.P.A. 1962)* the CCPA stated that "[n]ot every last detail is to be described, else patent specifications would turn into production specifications, which they were not intended to be." In

General Electric Co. v. Brenner, 407 F.2d 1258, 159 USPQ 335, 337 (D.C. Cir. 1968) it was held that specifications "need only be reasonable with respect to the art involved; they need not inform the layman nor disclose what the skilled already possess. ... The intricacies need not be detailed *ad absurdum*."

Applicant respectfully submits that paragraph [0021] sufficiently appraises a person of ordinary skill in the art of "the method mak[ing] use of the generally known slew rate limitation of the LO instability". A person of ordinary skill in the art would therefore understand that there is a correspondence between the known slew rate limitation and the LO instability. Applicant respectfully submits that it is within the skill of a person of ordinary skill in the art that the "correspondence" without limiting the invention may be achieved via various means including, for example: calculation, table lookup, etc.

Therefore, Applicant respectfully requests retraction of the §112 rejection in respect of claims 5, 10, 11, 23, 24 and 26.

Prior art characterization:

A4 In support of arguments for the patentability of the amended claims presented hereinbelow, Applicant respectfully submits the following characterization of the Huff cited prior art:

Huff describes the use of a composite trellis exclusively for decoding a received digitally modulated signal and a processor employing the composite trellis to decode a received digitally modulated signal. In Huff, and also in the other cited references, the composite trellis is applied to a specific modulation technique characterized by a signal phase which moves between a set of discrete phases employed in the modulation.

Applicant respectfully submits that the use of the composite trellis and the processing as described by Huff, does not characterize the undesired phase component itself. At best, the processor in Huff provides a sequence of estimated values which are assumed to correspond to an undesired signal phase component because they were not accounted for by the allowed discrete phase jumps of the specific modulation.

Further, Huff admits that this modulation specific approach results in undesired phase component estimate ambiguities. Huff describes two possible solutions to the ambiguities. The first solution is summarized in the second paragraph of column 7, wherein a trellis having a sufficiently large number of phase states is employed. Huff recognizes the undesired added processing of such a large trellis expressed in the second paragraph of column 9 thereof. The second solution described in the last paragraph of column 9 employs path history traceback.

The results described by Huff relate to a composite trellis having a trellis factor of 32 (the larger the number, the more computationally intensive) expending additional computational effort to perform phase history traceback, while achieving only an estimation of an undesired phase component of discrete modulation phases.

A characterization of Huff is provided in the specification in the last paragraph on page 2 of the National Phase entry application.

Differences between the prior art and the claimed invention:

A5 Applicant respectfully submits that the subject matter of the claims (as amended) relates to improving the sensitivity of demodulation of a received signal as separate from demodulating a received signal.

(i) In contrast with Huff, received signal processing is approached in a novel way namely, the received signal is considered to experience a phase excursion understood in the context of a continuous free-running oscillator, the phase variations of which are continuous in time. Relevant causes of the phase excursions include, but are not limited to: local oscillator instability, offset and drift, as well Doppler effects of the received signal itself (page 2 first paragraph, page 3 first paragraph, etc. of the U.S. National Phase entry application). Such a free-running oscillator includes as physical examples the low-quality, low-cost local oscillator, the Doppler shifted high-quality GPS SV signal, and the received CDMA pilot signal distorted due to the mobile handset being in motion.

(ii) In contrast with Huff (and the other cited prior art) which employs a composite-trellis and large computational resources to estimate an undesired phase component in the extracted signal, the claimed invention is directed to minimizing resources necessary to characterize the phase excursion. The MatLab simulation presented in the description, identifies the minimum size trellis necessary for modeling and tracking a continuous free-running oscillator phase excursion while using a minimum number of phase measurements and least computational resources (see first paragraph on page 8 of the National Phase entry application). In contrast with Huff which teaches the use of a composite-trellis with a large number of states to improve the estimation; the claimed invention employs a Markov process to model the continuous phase excursion which allows employing the least number of intervals to minimize the number of phase measurements, the size of the trellis, and thus minimize the processing overhead.

(iii) In contrast with Huff, the claimed invention provides the necessary phase trajectory determination using a trellis having a trellis factor of 16 to improve the sensitivity of the demodulation of a received signal (see line 11 page 8 of the National Phase entry application).

Put another way, the trellis in Huff models the encoded signal to extract the encoded signal, whereas the claimed trellis models possible phase excursions to determine the phase trajectory.

With respect to the claims:

A6 In response to the Examiner's rejection of independent claims 1, 15 (and 29) rejected under 35 U.S.C. §103(a) as stated at point 5 of the outstanding Office Action, Applicant respectfully submits that:

(i) The claims are directed to "defining possible state transitions from and to each phase state node". Huff describes something entirely different, namely a limitation to "allowed transitions" which restrict the trellis to characterize the expected modulated signal only. Support for this assertion is found in Huff lines 60 to 64 of column 5 and particularly lines 24 to 27 which read "This invention applies whenever the parameter value(s) associated with a state in a root trellis diagram explicitly or implicitly includes a value for the modulation phase of the transmitted signal". Applicant respectfully submits that in accordance with the claimed invention, in order to track the phase trajectory of the free running clock all transitions need to be considered and therefore be allowed, though some transitions may be highly

improbable as described at lines 3 to10 on page 6 of the National Phase entry application.

(ii) The amended claims now relate to "creating a likelihood metric for each path based on a measured phase of the correlation signal" and therefore the amended claims distinguish over Huff which is concerned only with the measured phase of the received signal.

(iii) The amended claims now relate to a "measured phase of the correlation signal having a random process approximated utilizing a discrete Markov process" and therefore the amended claims distinguish over Huff which does not describe any approximation as the Examiner admits in the first paragraph on page 6 of the outstanding Office Action.

(iv) The amended claims relate to "creating a likelihood metric for each path based on a measured phase of the correlation signal and the transition probability for the path" and therefore distinguish over Huff which teaches something entirely different, namely a likelihood metric corresponding to accumulated branch metrics in respect of the modulation.

(v) The amended claims now relate to "utilizing a Viterbi algorithm on said trellis to perform a maximum likelihood estimation of a phase trajectory of the correlation signal with said quantized resolution of phase states over 0 to 360° throughout the measurement time epoch". In respect of either the original or the amended version of the claims, Applicant respectfully submits that the Examine failed to produce objective prior art teaching of the claimed step because the passage in column 13

lines 29 to 34 cited to allegedly teach the impugned functionality in actual fact concerns a "no-migration composite trellis" as stated in same paragraph.

Therefore, for the above reasons Applicant respectfully submits that the Examiner failed to establish a *prima facie* case of obviousness in respect of independent claims 1, 15 (and 29) by failure to produce prior art teaching of each and every step/element claimed.

A7 Applicant respectfully submits that the amended independent claims 1, 15 (and 29) also distinguish over Schoolcraft, as they distinguish over Huff, because the trellis is configured to model the phase excursion of a free running oscillator (lines 1 and 2 on page 6 of the National Phase entry application) as opposed to modeling a modulation scheme (symbol intervals etc.). Applicant respectfully submits that Schoolcraft and, the combination of Huff and Schoolcraft, teach away from the claimed invention.

Therefore, Applicant respectfully submits that the Examiner failed to establish a *prima facie* case of obviousness in respect of independent claims 1, 15 (and 29) by failure to produce prior art which teaches the claimed invention.

A8 The amended independent claims 1, 15 (and 29) are directed to a "measured phase of the correlation signal having a random process approximated utilizing a discrete Markov process". Applicant respectfully submits that the measured phase of a correlation signal of a received signal is not the received signal, and therefore that a model of a received signal does not necessarily and without fail describe a measured phase of a correlation signal of a received

signal. Therefore, Pekarich teaches away from the claimed invention if Pekarich describes a "received signal having a random process approximated utilizing a discrete Markov process".

Therefore, Applicant respectfully submits that the Examiner failed to establish a *prima facie* case of obviousness in respect of independent claims 1, 15 (and 29) by failure to produce prior art reaching of each and every element/step claimed.

A9 Dependent claims 2 to 7, and 16 to 29 variously depend directly and/or indirectly respectively from independent claims 1 and 15 and therefore incorporate all respective limitations of independent claims 1 and 15. Therefore, Applicant respectfully submits that the Examiner failed to establish a *prima facie* case of obviousness in respect of dependent claims 2 to 7, and 16 to 28 by failure of produce prior art teaching of each and every claimed element and step thereof.

A10 In *In re Oetiker*, 977, F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992), the Federal Circuit stated that "[i]f the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent."

Applicant respectfully submits that the above arguments raise questions regarding the establishment of a *prima facie* case of unpatentability.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,

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